

REMARKS

Applicants respectfully request the Examiner to reconsider the present application in view of the foregoing amendments to the pending claims and present specification and the following remarks.

Status of Claims

In the present Amendment, claims 1-4 and 7-10 have been amended. Claims 5, 6, and 11-15 have been canceled herein without prejudice or disclaimer of the subject matter contained therein.

Claim 1 has been amended to incorporate the transition metal-containing polymerization catalyst of claim 11. The amendments to claims 2-4 and 7-10 have been made to change the dependency thereof, and to more clearly define the claims. Thus, no new matter has been added by way of the present amendments.

Specification

The Examiner objected to the Abstract of the Disclosure because it is too lengthy. The Abstract has been amended herein. Thus, this objection is overcome.

Objections to claims 8-10

Claims 8-10 were objected to on the ground that claim 9 was in improper dependent form. Office Action, page 2. The present amendment of claim 9 provides claim 9 in a form that is properly dependent from claim 1, thereby obviating this ground of objection.

Rejection Under 35 U.S.C. § 112

Claim 9 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. This rejection is respectfully traversed. Reconsideration and withdrawal thereof are respectfully requested. Claim 9 has been amended to change “ethylene/propylene/non-conjugated diene” to “ethylene/ α -olefin/non-conjugated diene” in order to conform to the antecedent basis provided by claim 1 from which claim 9 depends.

Rejection Under 35 U.S.C. § 103

Claims 1-4 and 7-10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mehta *et al.* (U.S. 6,300,451). Office Action, pages 3-4. This rejection is respectfully traversed. Reconsideration and withdrawal thereof are respectfully requested.

Mehta *et al.* teaches ethylene/ α -olefin/unconjugated polyene copolymers obtained by a polymerization process using a Ziegler-Natta catalyst. Also, Mehta *et al.* teaches that any Ziegler-Natta catalyst, or combinations of such catalysts, are useful in the polymerization process (lines 21-27 in column 10 of Mehta *et al.*).

In contrast, the presently claimed invention employs the novel catalysts now expressly recited in the claims before the Examiner. The catalysts of the present invention are significantly different from the catalysts of Mehta *et al.* Accordingly, the present invention is quite different from the invention of Mehta *et al.*

The catalysts used in the present invention have higher catalytic activity such that Applicants' catalysts can perform satisfactorily in smaller amounts, so that decatalyzation or demineralization of the resultant product are eliminated.

The present invention provides a method for the simple production of a copolymer having a low concentration of residual non-conjugated polyene, with minor accompanying problems such as low-level color development. Also, the ethylene/ α -olefin/non-conjugated polyene copolymer of the present invention has excellent low-temperature flexibility. These effects are achieved by the combination of features recited in Applicants' claim 1.

There is simply no suggestion in the prior art at the time the invention was made that the claimed limitations result in improved properties. Therefore, it is manifest that the presently claimed invention is not rendered obvious by the Mehta *et al.* disclosure.

Rejections Under 35 U.S.C. §§ 102/103

Claims 1-4 and 7-10 were rejected under 35 U.S.C. § 102(b) as being anticipated by, or in the alternative, 35 U.S.C. § 103(a) as obvious over, Kolthammer *et al.* (WO 98/02471). Office Action, page 4. Both of these rejections are respectfully traversed. Reconsideration and withdrawal thereof are respectfully requested.

Kolthammer *et al.* teaches ethylene/ α -olefin/unconjugated polyene copolymers obtained by a polymerization process using metallocene complexes as catalysts. Also, Kolthammer *et al.* discloses particular metallocene complexes as catalysts. See page 5, line 35 to page 40, line 16 of Kolthammer *et al.*

However, the present invention requires using the specific, novel catalysts now expressly recited in claim 1. The catalysts of the present invention are quite different from the catalysts disclosed in Kolthammer *et al.*, both in structure and in effect. Correspondingly, the present invention is significantly different from the technology disclosed by Kolthammer *et al.*

The catalyst used in the present invention has higher catalytic activity, such that the catalyst can perform satisfactorily in smaller amounts so that decatalyzation or demineralization of the resultant product can be eliminated. The present invention provides a simple process for the production of a copolymer that has a low concentration of residual non-conjugated polyene and that has reduced undesirable side effects such as low-level color development. Also, the ethylene/ α -olefin/non-conjugated polyene copolymer of the present invention has excellent low-temperature flexibility. These effects are achieved by incorporation of the features recited in Applicants' claim 1 into the presently claimed process.

Accordingly, the presently claimed invention is novel over Kolthammer *et al.* Also, no *prima facie* case of obviousness is established by the reference. There is simply no suggestion in the prior art at the time the invention was made that the limitations recited in the present claims result in improved properties.

Withdrawal of the rejections of record over the Kolthammer *et al.* reference is in order and is earnestly solicited.

Conclusion

A full and complete response has been made to all issues as cited in the Office Action. Applicants have taken substantial steps in efforts to advance prosecution of the present application. Applicants respectfully request that a timely Notice of Allowance issue for the present case.


Application No. 10/512,066
Art Unit 1713
Reply to Office Action of July 10, 2006

If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to contact Eugene T. Perez (Reg. No. 48,501) at the offices of Birch, Stewart, Kolasch & Birch, LLP.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Dated: OCT 6 2006

Respectfully submitted,

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ABSTRACT OF THE DISCLOSURE

Process for producing an ethylene/ α -olefin/non-conjugated polyene copolymer with good polymerization activity and high conversion of non-conjugated polyene, by providing a process for producing an ethylene/ α -olefin/non-conjugated polyene copolymer that comprises copolymerizing ethylene, an α -olefin, and a non-conjugated polyene in a hydrocarbon solvent with use of a transition metal compound catalyst, and removing the unreacted monomers and the hydrocarbon solvent from the copolymer solution without removing the catalyst residue, wherein the copolymerization is carried out at a polymerization temperature of 100°C or above and a polymerization pressure of 2.7 MPa or above in a manner such that the non-conjugated polyene concentration in the polymerization solution is less than the maximum non-conjugated polyene concentration C_{\max} (mol/L) as indicated: $C_{\max} = 0.050$ (mol/L) when the copolymer has an iodine value (IV) of 9.0 g/100 g to less than 17.0 g/100 g; or $C_{\max} = 0.104$ (mol/L) when the copolymer has an iodine value (IV) of 17.0 g/100 g or above.